WHAT IS CLAIMED IS:

1. An optical imaging device comprising:

a light source for supplying low coherent light so that tomographic images of an object can be constructed based on light reflected or scattered from the object to which the low coherent light is irradiated;

a light irradiating/receiving unit for irradiating the low coherent light supplied from said light source to said object, and receiving the light reflected or scattered from said object, said light irradiating/receiving unit including a first optical scanning block capable of scanning said object at least one-dimensionally in a direction of light reception or irradiation;

a first light path member over which the coherent light is propagated to said object and the light reflected or scattered from said object is propagated to said light irradiating/receiving unit;

a second light path member over which the low coherent light is propagated;

a first optical branching unit, interposed between light source and said first optical scanning block, for branching the low coherent light supplied from said light source into said first optical scanning block and said second light path member;

a second optical branching unit, included in said first optical scanning block, for branching out light reflected or scattered from said object from said first optical scanning block;

a second light path member over which the low coherent light branched by said optical branching unit is propagated;

a third light path member over which the reflected or scattered light branched out by said second optical branching unit is propagated;

a coupling unit for coupling the low coherent light propagated over said second light path member and the reflected or scattered light propagated over said third light path member so that the low coherent light and reflected or scattered light will interfere with each other;

a detection unit for detecting the interference caused by said coupling unit to produce an interfering signal;

an optical length variation unit, coupled to one of said second and third light path members, for varying at least one of a phase delay and a group delay of light by means of an incident light path and an emitted light path, which are mutually independent, and a light-transmissive optical element interposed between the incident light path and emitted light path, so that a point of interference can be scanned in the optical-axis direction; and

an image production unit for processing the interfering

signal detected by said detection unit to produce a tomographic image of said object.

2. An optical imaging device according to Claim 1, wherein said optical length variation unit includes a second optical scanning block for deflecting light propagated along said incident light path, and an optical element causing an optical length for light to vary depending on a direction selected by said second optical scanning block.

3. An optical imaging device according to Claim 2, wherein said optical length variation unit comprises:

a spectrum dispersion element for spatially dispersing the spectrum of light;

a light introduction block for introducing light from said incident light path to said spectrum dispersion element;

a phase modulator for substantially linearly modulating the phases of angular frequency components of the light dispersed by said spectrum dispersion element;

a spectrum reuniting element for reuniting the angular frequency components of the spatially dispersed light which are phase-modulated by said phase modulation element; and

a light pickup block for routing light emitted from said spectrum reuniting element to said emitted light path,

and

wherein these elements are optically interconnected, and a gradient in the phases of the angular frequency components of light to be modulated by said phase modulation element is changed with the passage of time.

4. An optical imaging device according to Claim 3, wherein:

said light introduction block comprises an introduction single-mode optical fiber over which light is introduced externally to said optical length variation unit, and a first positive lens;

said spectrum dispersion element comprises a pair of a first diffraction grating and a second positive lens;

said phase modulator is realized with a wedged prism made of a light-transmissive material and capable of rotating, and said wedged prism is rotated with a direction substantially parallel to a direction of light propagation as an axis;

said spectrum reuniting element comprises a pair of a second diffraction grating and a third positive lens; and

said light pickup block comprises a fourth positive lens and a pickup single-mode optical fiber over which light is extracted from said optical length variation unit.

5. An optical imaging device according to Claim 4, wherein focal lengths for said third positive lens and fourth positive lens meet a condition expressed as follows:

$$NA > f2(n-1)\phi / f4 \qquad \text{(condition 1)}$$

where f2 denotes the focal length for said third positive lens, f4 denotes the focal length for said fourth positive lens, n denotes the refractive index of said wedged prism, ϕ denotes the acute angle of said wedged prism, and NA denotes the numerical aperture of said pickup single-mode optical fiber.

6. An optical imaging device according to Claim 4, wherein at least one cone lens is interposed between said second diffraction grating and said fourth positive lens.

7. An optical imaging device according to Claim 4, wherein: a point through which a principal ray of light incident on said optical length variation unit, of which angular frequency corresponds to the center angular frequency component of the light, passes is matched with the center of rotation of said wedged prism; and said optical phase modulator is located on at least one of a reference light path and a sample light path.

8. An optical imaging device according to Claim 7,

wherein said optical phase modulator is realized with an acoustooptic element.

9. An optical imaging device according to Claim 4, wherein a point through which a principal ray of light incident on said optical length variation unit, of which angular frequency corresponds to the center angular frequency component of the light, passes is deviated from the center of rotation of said wedged prism, so that said optical length variation unit can serve as a phase modulator.

10. An optical imaging device according to Claim 4, wherein said wedged prism has a member attached to a hollow rotation shaft of a motor for detecting or controlling the phase of the rotation shaft.

11. An optical imaging device according to Claim 3, wherein:

said light introduction block comprises an introduction single-mode optical fiber over which light is introduced externally to said optical length variation optical system and a first positive lens;

said spectrum dispersion element comprises a first diffraction grating and a second positive lens;

said phase modulator is made by sandwiching a light-

transmissive liquid between at least two light-transmissive plates having flat surfaces, and an angle at which said at least two light-transmissive plates meet is changed with the passage of time;

said spectrum reuniting element comprises a second diffraction grating and a third positive lens; and

said light pickup block comprises a fourth positive lens and a pickup single-mode optical fiber over which light is extracted from said optical length variation unit.

12. An optical imaging device according to Claim 11, wherein focal lengths for said third positive lens and fourth positive lens meet a condition expressed as follows:

$$NA > f2 \cdot (n-1) \cdot \Delta\phi max / (2 \cdot f4) \qquad \text{(condition 4)}$$

where f2 denotes the focal length for said third positive lens, f4 denotes the focal length for said fourth positive lens, n denotes the refractive index of said light-transmissive liquid, $\Delta\phi$max denotes a maximum change in the angle at which said two light-transmissive plates meet, and NA denotes the numerical aperture of said pickup optical fiber.

13. An optical imaging device according to Claim 3, wherein:

said light introduction block comprises an introduction

single-mode optical fiber over which light is externally introduced to said optical length variation unit;

said spectrum dispersion element comprises a pair of a first diffraction grating and a second positive lens;

said phase modulator is made by sandwiching a light-transmissive liquid between at least two light-transmissive plates having flat surfaces, and an angle at which said at least two light-transmissive plates meet is changed with the passage of time;

said spectrum reuniting element comprises a pair of a second diffraction grating and a third positive lens;

said light pickup block comprises a fourth lens offering a positive power in the direction of a first axis and no power in the direction of a second axis perpendicular to said first axis, a fifth lens offering no power in said first-axis direction and a positive power in said second-axis direction, and a pickup single-mode optical fiber over which light is extracted from said optical length variation optical system; and

said second-axis direction is a direction perpendicular to a direction in which light is spatially dispersed by said first spectrum dispersion element.

14. An optical imaging device according to Claim 3, wherein:

said light introduction block comprises an introduction single-mode optical fiber over which light is externally introduced to said optical length variation unit, and a first positive lens;

said spectrum element comprises a pair of a first diffraction grating and a second positive lens;

said phase modulator is realized with a wedged prism made of at least one light-transmissive material, and said wedged prism is vibrated with a direction substantially perpendicular to a direction, in which the spectrum of light is dispersed spatially, as an axis; and

said spectrum reuniting element comprises a pair of a second diffraction grating and a third positive lens.

15. An optical imaging device according to Claim 14, wherein a wedged prism whose acute angle and refractive index are the same as those of said wedged prism serving as said phase modulator is interposed between said wedged prism serving as said phase modulator and said third positive lens.

16. An optical imaging device according to Claim 14, wherein a wedged prism whose acute angle and refractive index are the same as those of said wedged prism serving as said phase modulator is interposed between said wedged prism serving as said phase modulator and said second positive

lens.

17. An optical imaging device according to Claim 14, wherein said light pickup block comprises a fourth positive lens and a pickup single-mode optical fiber over which light is extracted from said optical length variation unit.

18. An optical imaging device according to Claim 14, wherein:

said light pickup block comprises a fourth lens offering a positive power in the direction of a first axis and no power in the direction of a second axis perpendicular to said first axis, a fifth lens offering no power in said first-axis direction and a positive power in said second-axis direction, and a pickup single-mode optical fiber over which light is extracted from said optical length variation unit; and

said second-axis direction is a direction perpendicular to a direction in which light is spatially dispersed by said first spectrum dispersion element.

19. An optical imaging device according to Claim 2, wherein said optical length variation unit varies an optical length for light traveling parallel to the optical axis.

20. An optical imaging device according to Claim 2, wherein said optical scanning block included in said optical length variation unit is an angle changing block for changing an angle of light per sec.

21. An optical imaging device according to Claim 20, wherein said angle changing block includes any of an acoustooptic deflector (AOD), an electrooptic deflector (EOD), and a holographic scanner.

22. An optical imaging device according to Claim 2, wherein said optical element causing an optical length for light to vary includes a Fresnel lens.

23. An optical imaging device according to Claim 2, wherein said optical element causing an optical length for light to vary is a converging member exhibiting a wavelength-dependent aberration, and said scanning block is realized with an acoustooptic element.

24. An optical imaging device according to Claim 1, wherein: said first optical branching unit and second optical branching unit are realized with a bi-directional optical fiber coupler having four terminals two of which are input terminals and the other two of which are output

terminals; said light source and third light path member are coupled to said two input terminals of said optical fiber coupler; and said first light path member and second light path member are coupled to said two output terminals of said optical fiber coupler.

25. An optical imaging device according to Claim 1, wherein said optical element included in said optical length variation unit has an optical lens and a stepped optical block causing an optical length for light to vary.

26. An optical imaging device according to Claim 25, wherein an optical element included in said optical length variation unit is realized with a stepped optical block being movable and causing an optical length for light to vary.

27. An optical imaging device according to Claim 26, wherein said optical block is realized with a plurality of optical blocks attached to a rotatable disk.

28. An optical imaging device according to Claim 25, wherein said optical length variation unit includes a beam reshaping block for elongating light and a disk having a plurality of holes and being rotatable.

29. An optical imaging device according to Claim 28, wherein said rotatable disk has a plurality of slits.

30. An optical imaging device according to Claim 28, wherein said rotatable disk has a plurality of pinholes.

31. An optical imaging device according to Claim 1, wherein said optical length variation unit includes a collimation member, dispersion elements opposed to each other and reciprocating together, and a re-collimation member.

32. An optical imaging device according to Claim 31, wherein said dispersion elements opposed to each other and reciprocating together are realized with diffraction gratings located parallel to each other, and at least ones of optical constants used to express the complex indices of refraction of the diffraction gratings are identical to each other.

33. An optical imaging device according to Claim 31, wherein said dispersion elements are prisms.

34. An optical imaging device according to Claim 31,

wherein a reciprocation block for reciprocating said dispersion elements is realized with an electromagnetic scanner.

35. An optical imaging device according to Claim 31, wherein a dispersion compensator is interposed between said collimation member and said re-collimation member.

36. An optical imaging device according to Claim 1, further comprising a first polarization control block for controlling polarization of light incident on said optical length variation unit, and a second polarization control block for controlling polarization of light emitted from said optical length variation unit and polarization of light returned from said light irradiating/receiving unit.

37. An optical probe apparatus for producing a signal whose components interfere with each other, comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block having a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to an object in said subject and over which light reflected from said object is

detected;

a light convergence block, incorporated in the distal part of said insertion unit, for converging light emitted from said optical fiber at said object and detecting light reflected from said object;

a scanning/irradiating unit for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning; and

an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other,

wherein: said scanning/irradiating unit comprises a rotation shaft incorporated in said elongated insertion unit and being freely rotatable, a light reflecting block attached to an end of said rotation shaft, and restricting members, incorporated in the distal part of said insertion unit, for restricting movement of said light reflecting block in the axial direction of said probe; and

said single-mode optical fiber and said light convergence block are disposed parallel to said rotation shaft.

38. An optical probe apparatus according to Claim 37, wherein said restricting members are bearings attached to

said rotation shaft.

39. An optical probe apparatus according to Claim 37, wherein said single-mode optical fiber is a polarization-maintaining (PM) optical fiber.

40. An optical probe apparatus according to Claim 37, wherein an optical fiber one of whose optical properties is different from that of said single-mode optical fiber is disposed substantially parallel to said single-mode optical fiber near an emission end of said single-mode optical fiber.

41. An optical probe apparatus according to Claim 40, wherein said optical fiber is a multi-mode optical fiber.

42. An optical probe apparatus according to Claim 40, wherein the wavelength-related property of said optical fiber is different from that of said single-mode optical fiber.

43. An optical probe apparatus according to Claim 40, wherein the optical durability of said optical fiber is different from that of said single-mode optical fiber.

44. An optical probe apparatus according to Claim 37,

further comprising an optical probe having an elongated insertion unit, an observation device, a joint connector for joining said optical probe and said observation device,

wherein said joint connector includes a rotary joint for conveying a torque to said shaft, and an observation light connector member used to join said single-mode optical fiber to another.

45. An optical probe apparatus according to Claim 44, wherein said optical probe has an optical fiber at least one of whose optical properties is different from said single-mode optical fiber, and said joint connector includes an optical fiber joint.

46. An optical imaging device comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block including a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to an object in said subject and over which light reflected from said object is detected;

a light convergence block, incorporated in the distal part of said insertion unit, for converging light emitted

from said optical fiber at said object and detecting light reflected from said object;

a scanning/irradiating block for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning;

a propagation time changing unit including an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other, and varying a propagation time that determines a scanned range containing a point of interference to be scanned in the optical-axis direction;

an optical detector for detecting the intensity of coherent light to produce an interfering signal

a light source control unit for controlling irradiation of light from said low coherent light source; and

a scan sensing unit for sensing the fact that said low coherent light source is driven,

wherein said light source control unit is driven according to a scanned state sensed by said scan sensing unit.

47. An optical imaging device according to Claim 46, wherein said scan sensing unit senses a driving signal with which said scanning/irradiating unit is driven.

48. An optical imaging device according to Claim 46, further comprising an optical probe that has said elongated insertion unit, a main unit, a joint connector for joining said optical probe and said main unit, and a joint sense block for sensing a joined state achieved by said joint connector,

wherein said light source control unit is driven according to the joined state sensed by said joint sense block.

49. An optical imaging device according to Claim 46, wherein: said scanning/irradiating unit irradiates laser light, of which wavelengths are different from those of said low coherent light, in the axial direction of said insertion unit simultaneously or in a time-sharing manner for the purpose of rotational scanning; a laser light irradiation control unit is included for controlling irradiation of laser light; said scan sensing unit detects the state of laser light irradiated for rotational scanning; and said laser light irradiation control unit is driven according to the irradiated state sensed by said scan sensing unit.

50. An optical imaging device according to Claim 49, further comprising:

a scanned point detecting unit for detecting a rotationally scanned point to which light is irradiated from said scanning/irradiating unit;

an irradiated point indicating unit for inputting an irradiated point to which said laser light is irradiated; and

a calculating unit for matching the irradiated point of said laser light with the rotationally scanned point,

wherein said laser light irradiation control unit is driven based on the calculated rotationally scanned point.

51. An optical imaging device according to Claim 50, wherein: said insertion unit includes an optical fiber over which laser light is propagated; the end of said optical fiber in said insertion unit is located near the end of said single-mode optical fiber from which low coherent light is emitted; said low coherent light travels substantially parallel to irradiated laser light; and said coherent light and laser light are converged by the same convergence block.

52. An optical imaging device according to Claim 49, further comprising an optical probe that has said elongated insertion unit, a main unit, and a joint connector for joining said optical probe and said main unit,

wherein said joint connector includes a joint sense

block, and said laser light irradiation control unit is driven based on a joined state sensed by said joint sense block.

53. An optical probe apparatus for producing a signal whose components interfere with each other, comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block including a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to an object in said subject and over which light reflected from said object is detected;

a light convergence block, incorporated in the distal part of said insertion unit, for converging light emitted from said single-mode optical fiber at said object and detecting light reflected from said object;

a scanning/irradiating unit for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning; and

an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other,

wherein: said insertion unit includes a sheath that is a thin tubular member;

said scanning/irradiating unit includes a flexible shaft having an end thereof coupled to a distal optical system including said light convergence block, in which said single-mode optical fiber is included, and an emitted light deflection block;

said flexible shaft is advanced or withdrawn in the axial direction of said insertion unit for the purpose of scanning; and

restricting members are included for restricting advancement or withdrawal of said flexible shaft.

54. An optical probe apparatus according to Claim 53, further comprising an optical probe that has said elongated insertion unit, an observation device, and a joint connector owing to which said optical probe can be freely detachable detached to said observation device,

wherein said restricting members for restricting a magnitude of movement of said flexible shaft are formed on said optical probe.

55. An optical probe apparatus according to Claim 54, wherein said restricting members include projections formed on a proximal part of said flexible shaft and projections

formed in a proximal part of said optical probe.

56. An optical probe apparatus for producing a signal whose components interfere with each other, comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block including a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to an object in said subject and over which light reflected from said object is detected;

a light convergence block, incorporated in the distal part of said insertion unit, for converging light emitted from said optical fiber at said object and detecting light reflected from said object;

a scanning/irradiating unit for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning; and

an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other,

wherein: said insertion unit has a sheath that is a thin tubular member;

said scanning/irradiating unit has a flexible shaft, which has an end thereof coupled to a distal optical system including said light convergence block, in which said single-mode optical fiber is included, and an emitted light deflection block, enclosed in said sheath;

said flexible shaft is advanced or withdrawn in the axial direction of said insertion unit; and

a rotary member is included for rotationally moving said flexible shaft in the axial direction of said insertion unit.

57. An optical probe apparatus according to Claim 56, wherein said rotary member includes a frictional member for confining the rotational movement in the axial direction to a certain angle of rotation.

58. An optical probe apparatus according to Claim 56, further comprising an optical probe that has said elongated insertion unit and an observation device, wherein said rotary member is included in said observation device.

59. An optical probe apparatus according to Claim 56, further comprising an optical probe that has said elongated insertion unit, and an observation device, wherein said rotary member is located proximally to said optical probe.

60. An optical probe apparatus producing a signal whose components interfere with each other, comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block including a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to an object in said subject and over which light reflected from said object is detected;

a convergence block, incorporated in the distal part of said insertion unit, for converging light emitted from said optical fiber at said object and detecting light reflected from said object;

a scanning/irradiating unit for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning; and

an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other,

wherein: said insertion unit has a sheath that is a thin tubular member; and

said scanning/irradiating unit has said light

convergence block, which is fused to the distal end of said single-mode optical fiber, and a reflecting surface formed as part of said convergence block enclosed in said sheath.

61. An optical probe apparatus according to Claim 60, wherein at least said single-mode optical fiber and said convergence block are rotated together within said sheath for the purpose of scanning.

62. An optical probe apparatus according to Claim 60, wherein a core of said single-mode optical fiber is expanded at an end thereof.

63. An optical probe apparatus according to Claim 60, wherein said convergence block is realized with a spherical lens.

64. An optical probe apparatus according to Claim 60, wherein said convergence block is realized with a gradient index device.

65. An optical probe apparatus according to Claim 60, wherein said reflecting surface is a curved surface.

66. An optical probe apparatus according to Claim 60,

wherein said single-mode optical fiber is covered with a fiber jacket, and said fiber jacket is processed in order to reduce abrasion.

67. An optical probe apparatus according to Claim 60, wherein said single-mode optical fiber is covered with a fiber jacket, and said fiber jacket is processed in order to improve the rigidity thereof.

68. An optical probe apparatus for producing a signal whose components interfere with each other, comprising:

a soft elongated insertion unit capable of being inserted into a subject;

a low coherent light source;

a light introduction block including a single-mode optical fiber over which low coherent light is irradiated from the distal end of said insertion unit to said object and over which light reflected from said object is detected;

a convergence block, incorporated in the distal part of said insertion unit, for converging light emitted from said optical fiber and detecting light reflected from said object;

a scanning/irradiating unit for irradiating said low coherent light emitted from said single-mode optical fiber for the purpose of scanning; and

an interference block for causing reflected light detected over said single-mode optical fiber and reference light supplied from said light source to interfere with each other,

wherein: said scanning/irradiating unit includes a first light deflection block for deflecting light, which is emitted from said single-mode optical fiber lying through said insertion unit, circumferentially relative substantially to the axial direction of said insertion unit, a rotational driving member for rotationally moving said first light deflection block substantially in the axial direction of said insertion unit, and a second light deflection block opposed to said first light deflection block and locked for deflecting light emitted from said first light deflection block substantially along an extension of said insertion unit.

69. An optical imaging device for irradiating low coherent light supplied from a low coherent light source to an object, and constructing tomographic images of said object using information represented by light scattered from said object, said optical imaging device comprising:

a light irradiating/receiving unit for irradiating said low coherent light to said object and receiving light reflected from said object;

a propagation time changing unit, connected to said light irradiating/receiving unit, for causing said low coherent light returned from said object and reference light to interfere with each other, and changing a propagation time that determines a scanned range containing a point of interference to be scanned in the optical-axis direction; and

an optical detector for detecting the intensity of coherent light to produce an interfering signal,

wherein: said low coherent light source includes a plurality of low coherent light sources and an optical fiber multiplexer for multiplexing light beams supplied from said plurality of low coherent light sources to propagate resultant light over an output single-mode optical fiber; and

the spectral density of light supplied from said low coherent light source displays the normal distribution.

70. An optical imaging device according to Claim 69, wherein said optical fiber multiplexer is realized with a wavelength-dependent optical coupler.

71. An optical imaging device according to Claim 69, wherein an optical filter for attenuating at least part of the spectrum of light supplied from each of said plurality

of low coherent light sources is interposed between an output terminal of each of said light sources and said output single-mode optical fiber.

72. An optical imaging device according to Claim 69, wherein:

said low coherent light source includes two low coherent light sources;

said optical fiber multiplexer includes a polarization beam splitter for multiplexing light beams that have fallen on a first polarizing surface thereof and a second polarizing surface thereof which are orthogonal to each other;

low coherent light supplied from a first low coherent light source falls on said first polarizing surface of said polarization beam splitter while exhibiting a plane of polarization matched with said first polarizing surface, low coherent light supplied from a second low coherent light source falls on said second polarizing surface of said polarization beam splitter while exhibiting a plane of polarization matched with said polarizing surface, and the low coherent light beams are multiplexed in order to propagate resultant light over said output single-mode optical fiber.

73. An optical imaging device for irradiating low coherent light to an object and constructing tomographic images of said object using information represented by light scattered from said object, said optical imaging device comprising:

a light irradiating/receiving unit for irradiating said low coherent light to said object and receiving light reflected from said object;

a propagation time changing unit, connected to said light irradiating/receiving unit, for causing low coherent light returned from said object and reference light to interfere with each other, and changing a propagation time that determines a scanned range containing a point of interference to be scanned in the optical-axis direction; and

an optical detector for detecting the intensity of coherent light to produce an interfering signal,

wherein said light irradiating/receiving unit includes a convergence block for converging low coherent light at said object, and said convergence block has a plurality of foci.

74. An optical imaging device according to Claim 73, wherein said convergence block includes a diffraction element, and said plurality of foci is the foci of first-

order diffracted light produced by said diffraction grating and higher-order diffracted light rays produced thereby.

75. An optical imaging device according to Claim 73, wherein said convergence block includes a refraction lens having a plurality of surfaces that converges light rays at said plurality of foci.

76. An optical imaging device according to Claim 75, wherein said refraction lens is realized with a Fresnel lens.

77. An optical imaging device according to Claim 75, wherein the focus of said refraction lens is different between the center and perimeter thereof.

78. An optical imaging device according to Claim 75, wherein said refraction lens is divided into lenses having different foci.

79. An optical imaging device according to Claim 73, wherein said convergence block is realized with a condenser mirror having a plurality of surfaces that converges light rays at said plurality of foci.

80. An optical imaging device for irradiating low

coherent light to an object and constructing tomographic images of said object using information represented by light scattered from said object, said optical imaging device comprising:

a light irradiating/receiving unit for irradiating said low coherent light to said object and receiving light reflected from said object;

a propagation time changing unit, connected to said light irradiating/receiving unit, for causing low coherent light returned from said object and reference light to interfere with each other, and changing a propagation time that determines a scanned range containing a point of interference to be scanned in the optical-axis direction; and

an optical detector for detecting the intensity of coherent light to produce an interfering signal,

wherein said light irradiating/receiving unit includes a convergence block for converging low coherent light at said object, and said convergence block includes a quasi non-diffracted beam producing member.

81. An optical imaging device according to Claim 80, wherein said quasi non-diffracted beam producing member is realized with an axicon (conical) lens.